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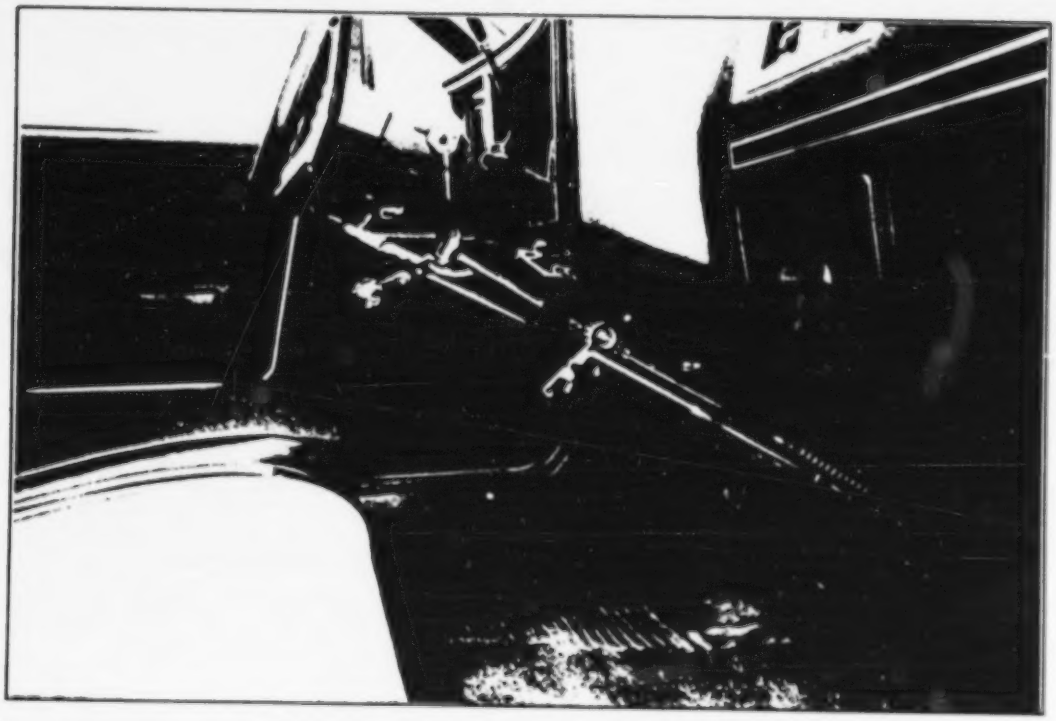

QUICK RELEASE HAND CONTROLS UNIT

Installation Instruction Manual

Prepared for:
TRANSPORTATION DEVELOPMENT CENTRE

Prepared by:
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Davis Engineering
consulting Engineers

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Montreal, Quebec

Prepared By:

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17. Abstract

The Quick-Release Hand Controls Unit: Installation Instruction Manual provides a description of the hardware components of the system (mounting bracket and hand controls unit) and a step-by-step guide to the installation of the system in an automobile.

The Quick-Release system was developed for application to rental cars. The unit can be quickly installed by car rental concessionaires to adapt vehicles for the use of handicapped drivers, and quickly disconnected when not required.

A demonstration of the hand controls sytem and an audio-visual presentation were prepared as part of an instruction package.

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17. Résumé

Système de commandes manuelles amovibles. Le guide de pose et de dépose est fait d'un descriptif des composantes de ce système (support de montage et organes de manoeuvre) et d'instructions détaillées pour son installation dans un véhicule automobile.

Ce système de commandes manuelles amovibles a été conçu pour l'adaptation rapide des voitures de louage aux besoins des conducteurs handicapés. Dès que la présence du système devient superflue, la dépose se fait rapidement.

Un modèle du système à commandes manuelles et un programme audio-visuel pertinent ont été mis au point pour fins de démonstration pratique et théorique.

18. Mots-clés	19. Diffusion
Commandes manuelles amovibles, pose/dépose, véhicules adaptés, handicapés.	Le CDT dispose d'un nombre limité d'exemplaires

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1.0 INTRODUCTION

Currently, most Canadian car rental concessionaires do not provide vehicles equipped with hand controls for handicapped drivers principally for the following reasons:

1. hand control units require several hours to install, and

2. once installed, the hand controlled vehicle would be designated for handicapped drivers only, limiting the potential rental of the vehicle to non-handicapped drivers.

As a result, rental vehicles are not available to handicapped drivers, consequently limiting their transportation options.

The availability of quick connect/disconnect automobile hand controls is a potential solution to this problem. In a matter of minutes, a vehicle which was previously used without hand controls can be equipped with hand controls, thus providing a service to handicapped drivers with minimal additional effort required by the concessionaires.

Under contract to the Transportation Development Centre of Transport Canada, Davis Engineering Limited of Ottawa designed and installed a prototype quick release hand control unit in an automobile. Once permanent mounting brackets are installed, the unit requires approximately two minutes to install and 30 seconds to remove.

This instruction manual has been written to aid participating car rental concessionaires to:

(i) install the mounting brackets in the selected car, and

(ii) install the quick connect/disconnect hand control unit in the car with mounting brackets.

2.0 SYSTEM DESCRIPTION

2.1 QUICK CONNECT/DISCONNECT HAND CONTROLS UNIT

The Quick Disconnect Hand Control Unit (Figure 1) is a modified version of a commercially available, right-angle-actuated hand controller with variable throttle spring return. The hand control system is a left-hand unit and operates the brake and throttle functions only. The linkages are arranged such that a forward push will activate the brake, and a downward motion (perpendicular to the braking motion) will activate the throttle (Figure 1). The return-to-neutral spring (automatic) is adjustable on the throttle control only. The unit is adaptable in size, and can be adjusted to fit most mid-size or large cars.

The automobile can be driven in "normal" mode even with the hand controls installed.

2.2 HAND CONTROLS - MOUNTING SYSTEM

The interface between the hand control unit and the vehicle (Figure 2) consists of four brackets designed to support the operational leads and not to interfere with the operation or operator of the vehicle under normal driving conditions. These interfacing brackets are permanently installed in four unobtrusive locations:

(i) on the throttle linkage,

(ii) on the brake pedal arm,

(iii) on the floor between the throttle and brake pedals, and

(iv) on the steering column yoke.

Once the brackets are in place, no tools are required to install or remove the hand controls unit.

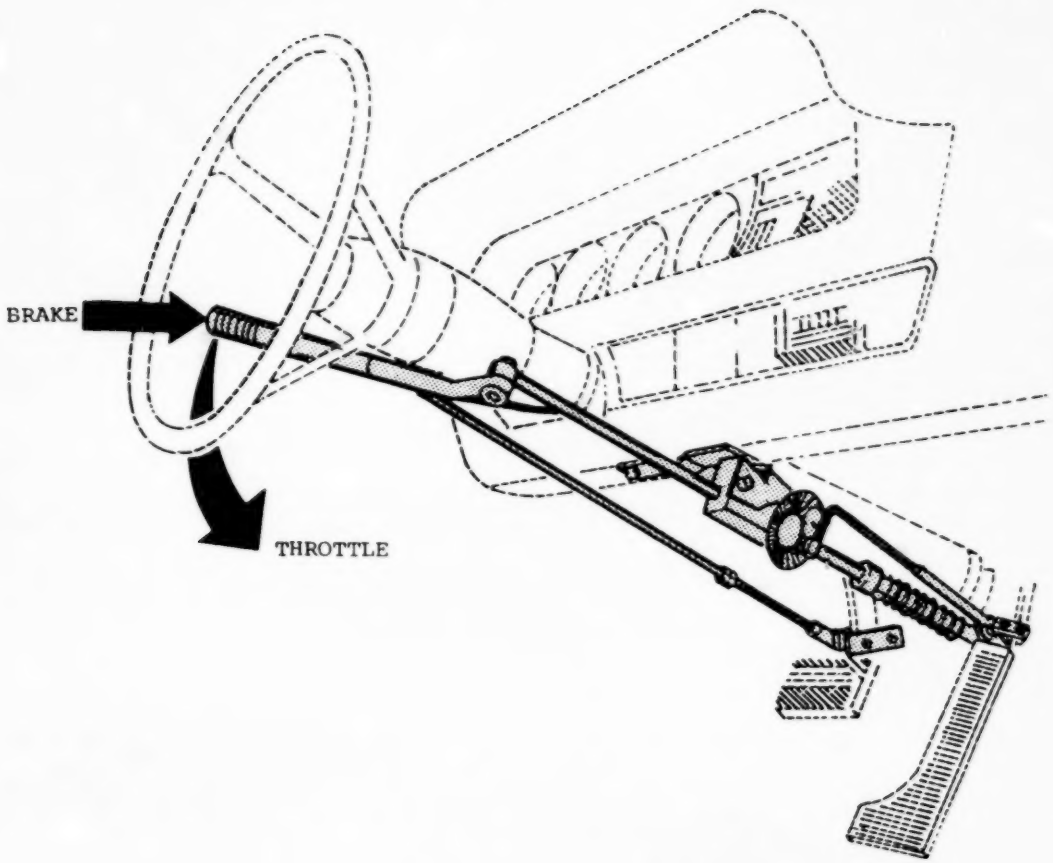

FIGURE 1 QUICK CONNECT/DISCONNECT HAND CONTROLS UNIT: OPERATION

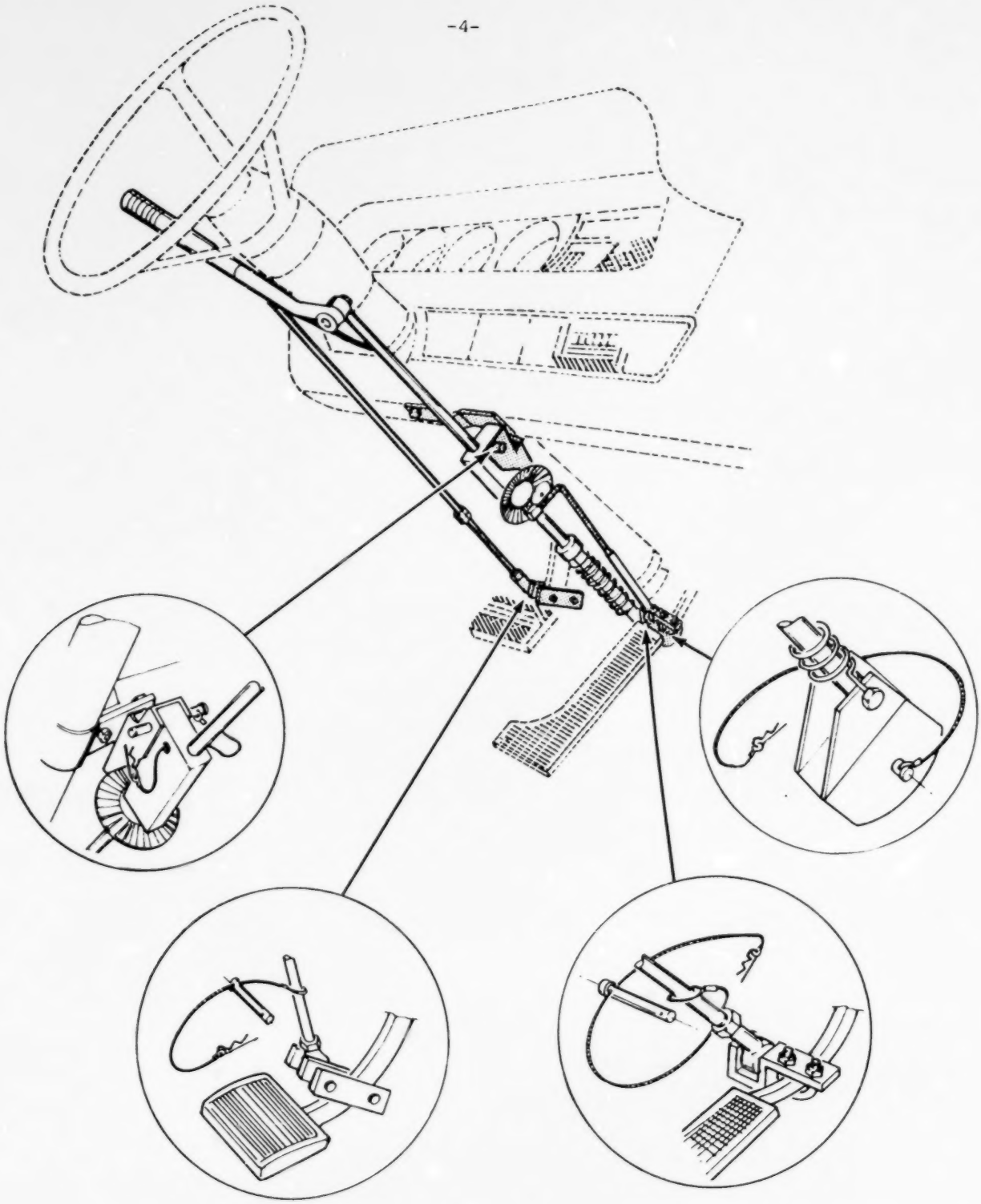

FIGURE 2 QUICK CONNECT/DISCONNECT HAND CONTROLS UNIT: BRACKET LOCATIONS

PARTS LISTING

ITEM	REFERENCE NO.	DESCRIPTION	QTY.
1	DE Drwg. No. 2076	Accelerator Bracket	1
2	DE Drwg. No. 2077/2078	Steering Column Bracket	1
3	DE Drwg. No. 2079	Floor Bracket - Mounting Column	1
4	DE Drwg. No. 2080	Floor Bracket - Intermediate	1
5	DE Drwg. No. 2081	Brake Pedal Bracket	1
6	DE Drwg. No. 2327	Quick Release Hand Control Unit (modified WRIGHT-WAY, INC.)	1
7	Commercial	Bolt, 9.5 mm (.375 in.) dia. x 25.4 mm (1 in.) lg. (brake bracket)	2
8	Commercial	Bolt, 6.4 mm (.25 in.) dia. x 25.4 mm (1 in.) lg. (floor bracket)	3
9	Commercial	U-Bolt, 6.4 mm (.25 in. dia. x 12.7 mm (1/2 in.) lg. GAP (accel. bracket)	1
10	Commercial	Washer, Locking, 9.5 mm (.375 in.) dia.	2
11	Commercial	Washer, Flat, 6.4 mm (.25 in.) dia.	4
12	Commercial	Nut, Hex, 6.4 mm (.25 in.) dia.	5

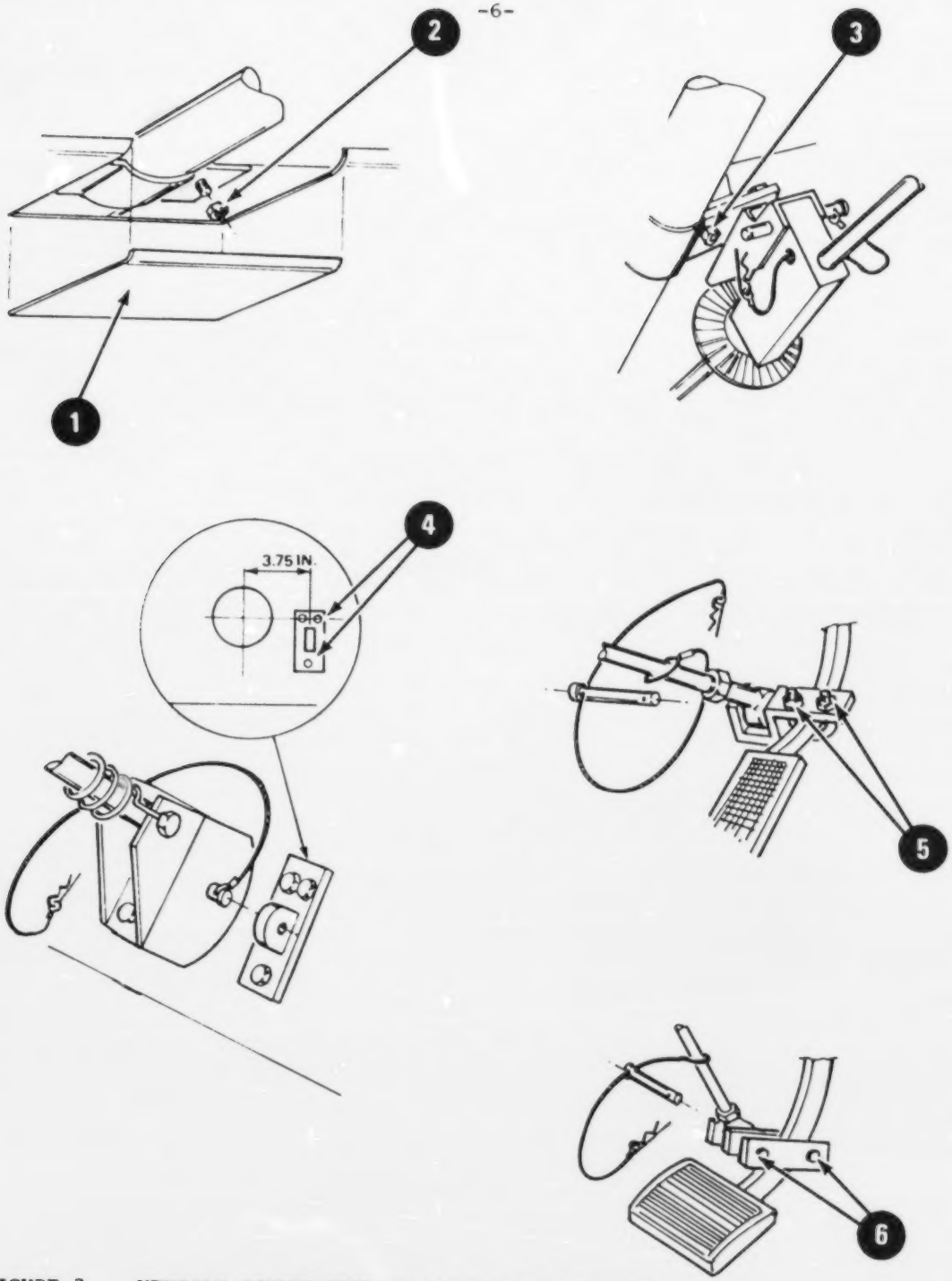

FIGURE 3 VEHICLE CONVERSION: BRACKET INSTALLATION
(BLACK BALLOON CORRESPOND TO STEP NUMBER IN SECTION 3.1)

3.0 INSTALLATION INSTRUCTIONS

3.1 VEHICLE CONVERSION

The step numbers coincide with the numbers on the diagram (see Figure 3). Item numbers are also included to allow for cross-referencing to the parts list.

STEP NO. INSTRUCTIONS AND HARDWARE

1. Disconnect cosmetic shield covering the steering column yoke.

2. Remove steering column yoke support nut.

3. Fasten the steering column support bracket (ITEM 2) using the bolt removed from step (2). Ensure that the quick release hand control unit does not interfere with the bottom of the dash board.

4. Drill three holes through the car floor using the bracket (ITEM 3) as a template. Note that the hand control column should be parallel to the steering wheel column. Secure using:

   3 - Bolt (ITEM 8)
   3 - Washer (ITEM 11)
   3 - Nut (ITEM 12)

5. Fasten U-bolt accelerator bracket (ITEM 1) to the accelerator pedal arm so that, (i) the bracket is as close to the pedal arm as possible without impeding its movement and, (ii) the accelerator connecting rod attaches to the left side of the pedal stem. Secure using:

   1 - U-Bolt (ITEM 9)
   2 - Nut (ITEM 12)

6. Attach the brake pedal bracket (ITEM 5) so that (i) it is as close to the pedal as possible without impedeing its movement and (ii) the brake pedal connecting rod attaches to the left of the pedal stem. Secure using:

   2 - Bolt (ITEM 7)
   2 - Washer (ITEM 10)

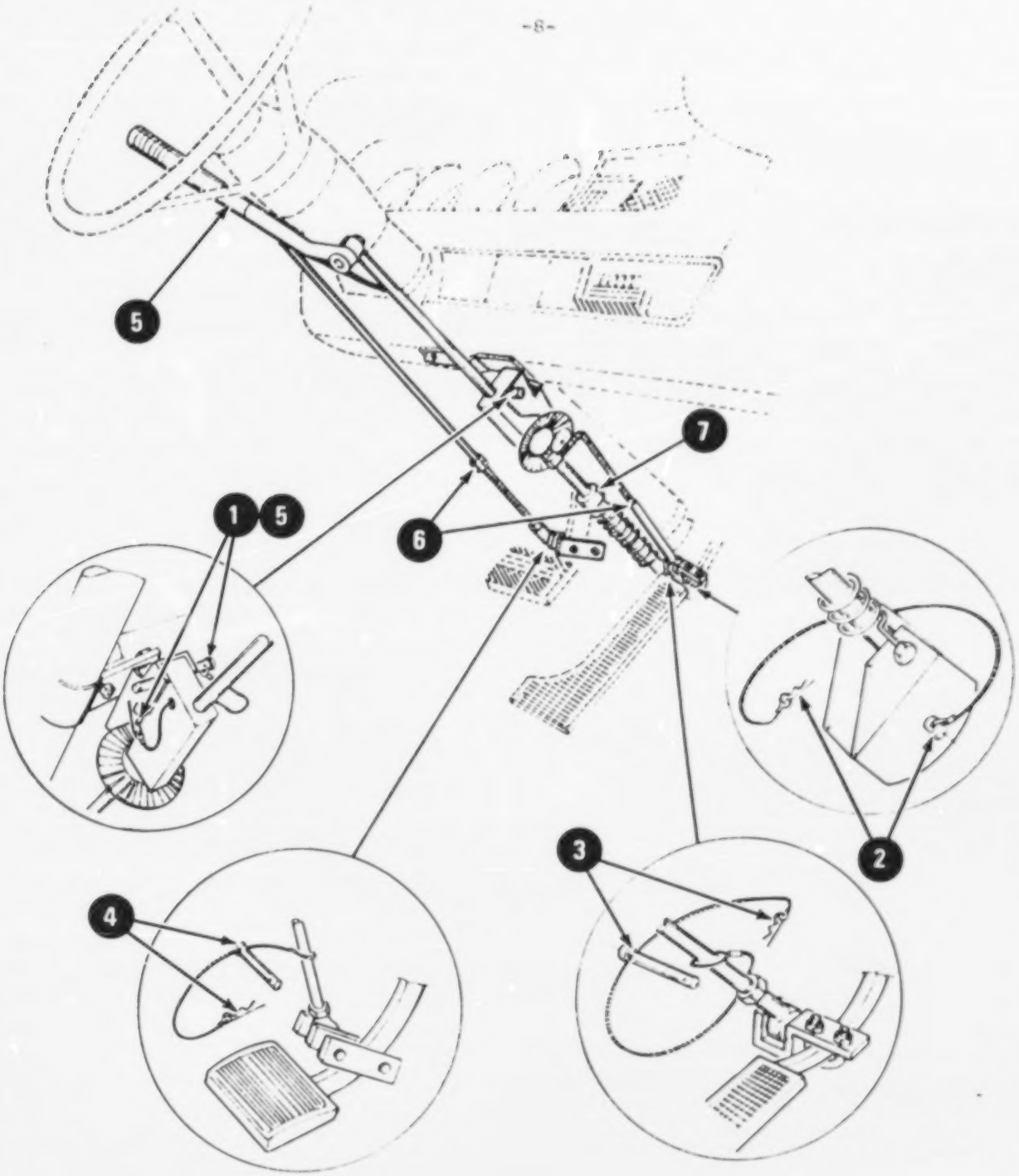

FIGURE 4 QUICK CONNECT/DISCONNECT HAND CONTROLS INSTALLATION
(BLACK BALLOON CORRESPOND TO STEP NUMBER IN SECTION 3.2)

3.2 QUICK RELEASE HAND CONTROLS INSTALLATION

The step numbers coincide with the numbers in the diagram (Figure 4). Item numbers are also included to allow for cross-referencing to the parts list. Before proceeding, remove any cosmetic covers from the hand control unit and position unit in the car with the connecting rods towards floor and the handle towards the driver door.

STEP NO.	INSTRUCTIONS AND HARDWARE
1	Position attachment point on the main column of the hand controls unit (ITEM 6) to the bracket on the steering column (ITEM 2). Insert the attached shoulder locking pin from right to left through the bracket and main column holes.
2	Position the end of the main column of the hand controls unit (ITEM 6) into the floor bracket (ITEM 2). Insert the attached locking pin through the bracket and the main column holes. Secure by threading the hitching pin through the hole at the end of the locking pin.
3	Position the brake rod of the hand control unit (ITEM 6) to the brake pedal bracket (ITEM 5). Insert the attached locking pin from left to right through the bracket and brake column holes. Secure by threading the hitching pin through the hole at the end of the locking pin.
4	Position the accelerator connecting rod of the hand controls unit (ITEM 6) on the throttle bracket (ITEM 1). Insert the locking pin from left to right through the bracket and accelerator rod holes. Secure with the attached hitching pin.
5	For final alignment, remove the locking pin in the main column bracket (ITEM 2), position the control arm of the hand controls unit (ITEM 6) as close to the steering column as possible and re-insert the locking pin from right to left through the bracket and main column holes. Secure with the attached hitching pin.
6	Check for full throttle and brake travel of the quick connect hand controls (ITEM 6) and adjust if necessary. (Note: to adjust, turn the connecting rod and secure with the lock nut provided).

STEP NO. INSTRUCTIONS AND HARDWARE

7 Adjust the accelerator tension of the quick release hand control unit (ITEM 6) by aclockwise rotation then securing the collar on the main column with wing nut bolt attached.

8 Test the function of the throttle and brake control, and verify that all lock pins are in place, and lock nuts are tight.

To remove the hand control unit, perform the following steps as listed:

1) pull out all four hitch pins and locking pins from brackets (ITEMS 1, 5, 3, 2),

2) remove unit (ITEM 6), and

3) install any cosmetic covers required.

4.0 TROUBLESHOOTING

4.1 INSTALLATION CONCERNS

PROBLEM	POSSIBLE REMEDY
. Inserting the locking pin through the main column on the floor bracket can be difficult due to its proximity to the brake and gas pedals.	. Be sure to hook this pin up after the steering column and before the accelerator and brake pins. . By kneeling on the ground outside the car, the installer can get lower and closer to the apparatus. . Juggle the main column while pressing on the locking pin.
. Increasing throttle return spring tension.	. Use a pair of pliers to assist in rotating the collar while tightening the wing nut with the other hand.

4.2 OPERATIONAL CONCERNS

PROBLEM	POSSIBLE REMEDY
. Brake and accelerator pedal can be depressed simultaneously.	. Allows the throttle spring to return the control arm to a neutral or idle position before engaging the brake pedal.
. Interface of control arm with steering column, side door of vehicle or driver's knees.	. Repeat step 5 of Section 2.2